

## In the Claims

1. (currently amended) A method for comparing features of a test record with features of a reference record, each feature having a location and orientation, comprising:
  - determining a weight for each feature of the reference record;
  - aligning the features of the test record with the features of the reference record;
  - measuring differences between the locations and orientations of the features of the reference record and the features of the test record; and
  - summing the weights of all features of the reference record that are less than a predetermined difference when compared with the features of the test record to determine a similarity score that the test record matches ~~for~~ the reference record.
2. (original) The method of claim 1 further comprising:
  - comparing the features of the test record with a plurality of reference records to determine a plurality of similarity scores; and
  - selecting a particular reference record as a candidate reference record if the corresponding similarity score is greater than a maximum threshold.
3. (original) The method of claim 1 further comprising:
  - extracting the features from images of fingerprints.
4. (original) The method of claim 1 wherein the alignment is a rigid transformation including global translation and rotation.

5. (original) The method of claim 1 wherein the alignment is a rigid transformation including only global translation to approximately align the features of the test record with the features of the reference record.
6. (original) The method of claim 5 wherein a probability of matching features is represented by a zero-mean Gaussian function  $f(0; \sigma^2)$ , where  $\sigma^2$  is a variance of the function.
7. (original) The method of claim 1 further comprising:  
measuring differences only between pairs of features that are approximately aligned.
8. (original) The method of claim 1 wherein the determining step further comprises;  
identifying, for each feature in the reference record, a local neighborhood of features; and  
setting the weight of each feature proportional to a function of distances between each feature and the local neighborhood of features.
9. (currently amended) The method of claim 8 wherein the ~~distance~~ distance function for weight  $w_i$  and  $k$  features in the local neighborhood is  $N \frac{D(d_i^1, d_i^2, \dots, d_i^k)}{\sum_{j=1}^N D(d_j^1, d_j^2, \dots, d_j^k)}$ ,  
where  $d_i^n$  is an  $n$ th distance of feature  $i$ ,  $N$  is a number of features, and  $D$  is a distance function.
10. (original) The method of claim 8 wherein the distance function is an arithmetic mean.

11. (original) The method of claim 8 wherein the distance function is a geometric mean.
12. (original) The method of claim 8 wherein the distance function is maximum distance.
13. (original) The method of claim 1 wherein the sum of the weights of the features of the reference record is normalized to one.
14. (currently amended) The method of claim 6 wherein the similarity score  $S$  for a test record  $T$  of  $M$  features and a reference record  $R$  of  $N$  features is determined by
$$S(T, R) = \frac{2}{(N + M)} \sum_{j=1}^M \sum_{i=1}^N w_i f(x_j - x_i; \sigma_x^2) f(y_j - y_i; \sigma_y^2) f_q(q_j - q_i; \sigma_q^2),$$
where  $x$  and  $y$  represent the location of the feature,  $q$  the orientation of the feature,  $w$  the weight of the feature, and  $f$  is a difference function.

15. (new) A method for comparing features of a test record with features of a reference record, each feature having a location and orientation, comprising:  
determining a weight for each feature of the reference record, the  
determining further comprising:  
identifying, for each feature in the reference record, a local  
neighborhood of features; and  
setting the weight of each feature proportional to a function of  
distances between each feature and the local neighborhood of features;

aligning the features of the test record with the features of the reference record;

measuring differences between the locations and orientations of the features of the reference record and the features of the test record; and

summing the weights of all features of the reference record that are less than a predetermined difference when compared with the features of the test record to determine a similarity score that the test record matches the reference record, and wherein the similarity score  $S$  for a test record  $T$  of  $M$  features and a reference record  $R$  of  $N$  features is determined by

$$\underline{S(T, R)} = \frac{2}{(N + M)} \sum_{j=1}^M \sum_{i=1}^N w_i f(x_j - x_i; \sigma_x^2) f(y_j - y_i; \sigma_y^2) f_q(q_j - q_i; \sigma_q^2), \text{ where } x$$

and  $y$  represent the location of the feature,  $q$  the orientation of the feature,  $w$  the weight of the feature, and  $f$  is a difference function.